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**From:** d'Almeida, Carolyn K. [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=9EC4401AFA1846DD93D52A0DDA973581-CDALMEID]  
**Sent:** 6/24/2016 4:17:56 PM  
**To:** Davis, Eva [Davis.Eva@epa.gov]; Dan Pope [DPope@css-dynamac.com]  
**Subject:** FW: sodium sulfate and magnesium sulfate injection  
**Attachments:** Bldg 631 3 Qtr 2007 text, tbls, grphs.pdf

Here, you look at this... I can't look at it anymore. Calgon... take me away!

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**From:** Caraway, Rosemarie  
**Sent:** Friday, June 24, 2016 9:03 AM  
**To:** d'Almeida, Carolyn K. <dAlmeida.Carolyn@epa.gov>  
**Subject:** FW: sodium sulfate and magnesium sulfate injection

Carolyn here is the report that John sent as FYI. Now if you and Eva can get the folks at the Williams facility to give the regulatory agents the appropriate technical information...ie does your plume contain sulfate reducing bacteria and at what concentrations and levels? Are they at levels where this "newer remedy" could actually work or are they just hearing the new information and wanting to "try it" to get out of their commitment to truly clean up the site? The injection remedy is less expensive than having to heat more of this NAPL that has shown up in the subsurface.

Rose Marie Caraway, MBA  
Environmental Scientist  
Remedial Project Manager  
75 Hawthorne Street, SFD 7-2  
San Francisco, CA 94105  
(415)972-3158

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**From:** John Wingate [mailto:JWingate@otie.com]  
**Sent:** Wednesday, June 22, 2016 5:51 PM  
**To:** Caraway, Rosemarie <Caraway.RoseMarie@epa.gov>  
**Subject:** sodium sulfate and magnesium sulfate injection

Hi Rosie,

Actually Tim, Mike Berman, and Ewelina implemented sodium sulfate and magnesium sulfate injection. Please see the attached Report, **Section 1.4**. The technology is counter-intuitive, but it can work if certain conditions are present.

In summary:

"The enhanced bioremediation technology chosen for the Site involves the injection of magnesium sulfate and sodium sulfate to the groundwater plume to promote biostimulation of sulfate-reducing bacteria. Sulfate-reducing bacteria utilize sulfate as an oxidizing agent to produce sulfide and require organic compounds as a source of carbon and energy. Due to the increased bioavailability of sulfate in the groundwater, more sulfate will be reduced and thus, the bioremediation of the gasoline-contaminated groundwater at the Site will be enhanced. "

Report attached for your reference.

**John Wingate, P.E.**  
*Senior Engineer/Project Manager*

Oneida Total Integrated Enterprises (OTIE)  
317 East Main Street

Ventura, CA 93001  
805.585.6389 direct  
805.585.2111 fax  
[www.otie.com](http://www.otie.com)



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